

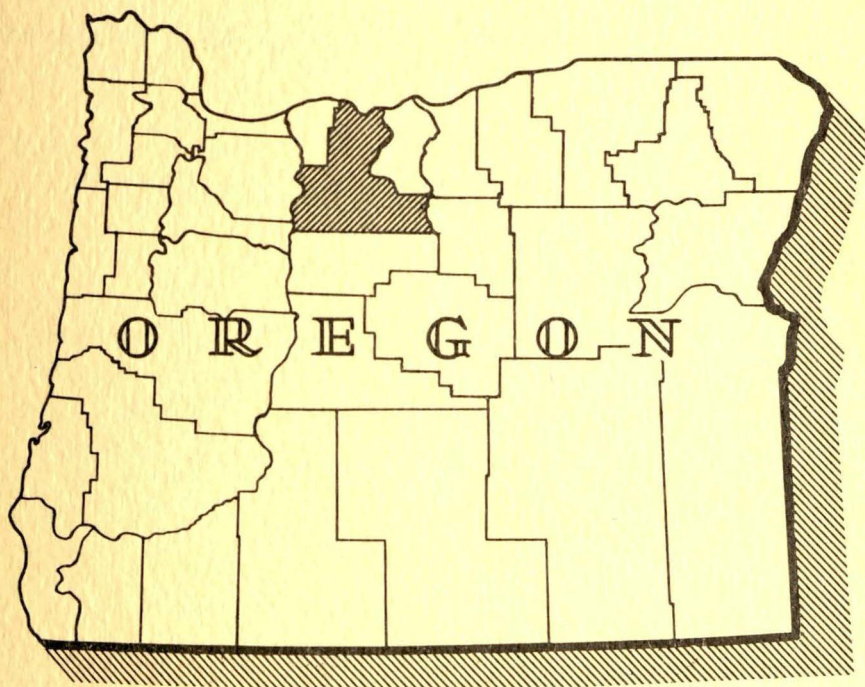
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FOREST STATISTICS FOR WASCO COUNTY, OREGON

FOREST SURVEY REPORT NO. 127



PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION
R. W. COWLIN, DIRECTOR

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

PORTLAND, OREGON



JULY 1958

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Acknowledgment is made of cooperation from public and private agencies in furnishing cutting and ownership records.

FOREST STATISTICS
FOR
WASCO COUNTY, OREGON

by

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and
Benjamin Spada

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FOREST SERVICE

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PREFACE

This publication summarizes in statistical form the results of a reinventory of the forests of Wasco County, Oreg., conducted in 1954. This reinventory is a part of the maintenance phase of the Forest Survey, a nationwide project of the Forest Service authorized by the McSweeney-McNary Forest Research Act of 1928, amended June 25, 1949. The purpose of the Forest Survey is to periodically inventory the extent and condition of forest lands and the timber and other products on them, to ascertain rates of forest growth and depletion, to estimate present consumption of timber products and to analyze and make available in reports survey information needed in the formulation of forest policies and programs.

The Forest Survey is conducted in the various forest regions of the Nation by the regional forest experiment stations of the Forest Service. In the Pacific Northwest region of Oregon and Washington it is an activity of the Pacific Northwest Forest and Range Experiment Station at Portland, Oreg.

Under the initial phase of the Forest Survey, the forests of Wasco County were inventoried in 1933 and 1934. A statistical report, "Forest Statistics for Wasco County, Oregon," and a detailed forest type map--scale 1 inch to the mile--were released. The reinventory has resulted in a revised statistical report and forest type map, which is available on a scale of either 1 or 2 inches to the mile.^{1/}

^{1/} Prints of the forest type map are available at cost of blue-printing. For information write Director, Pacific Northwest Forest and Range Experiment Station, P. O. Box 4059, Portland 8, Oreg.

CONTENTS

Page

Preface

Map, Forest Stand-Size and Condition Classes, Wasco
County, Oreg., 1954

DESCRIPTION OF THE COUNTY	1
SIGNIFICANT FINDINGS IN THE FOREST INVENTORY	2
Land Classification	2
Commercial Forest Land Area	3
Major Types	3
Stand-Size Class	3
Stocking of Young-Growth Stands	4
Commercial Forest Land Timber Volumes	5
Volume of Sawtimber by Species	5
Volume of Sawtimber by Diameter Classes	6
Volume of Growing Stock by Species	6
Forest Ownership	7
Commercial Forest Land	7
Sawtimber Volume	7
Forest Utilization	8
SUMMARY TABLES.	9
FOREST SURVEY PROCEDURE	22
Initial Inventory	22
Reinventory	23
ACCURACY OF 1954 REINVENTORY DATA	23
Forest Area	23
Timber Volume	24
DIFFERENCES IN RESULTS OF INVENTORIES	24
Forest Area	24
Timber Volume	25

	<u>Page</u>
DEFINITION OF TERMS USED	26
Land Area	26
Forest Land Classes	27
Types	27
Tree Classes	29
Stand-Size Classes	30
Timber Volume	31
Timber Cut	32

List of Tables

1. Land area, by major class of land, 1954	9
2. Area of commercial forest land, by ownership and stand-size classes, 1954	10
3. Area of commercial forest land, by major forest type and stand-size class, 1954	11
4. Land area, by cover type, ownership class, and land-use class, 1954	12, 13
5. Area of commercial forest land, by forest-condition and ownership classes, 1954	14
6. Area of young-growth timber stands on commercial forest land, by stocking class, species group, and stand-size class, 1954	15
7. Net volume of live sawtimber and growing stock on commercial forest land, by ownership class, 1954	16
8. Net volume of live sawtimber and growing stock on commercial forest land, by stand-size class, 1954	17
9. Net volume of live sawtimber and growing stock on commercial forest land, by species, 1954 . . .	18
10. Net volume of live sawtimber on commercial forest land, by diameter class and species group, 1954	19
11. Net volume of all timber on commercial forest land, by class of material and species group, 1954 . .	20
12. Average annual cut from live sawtimber and growing stock on commercial forest land, by species group, 1949-53	21

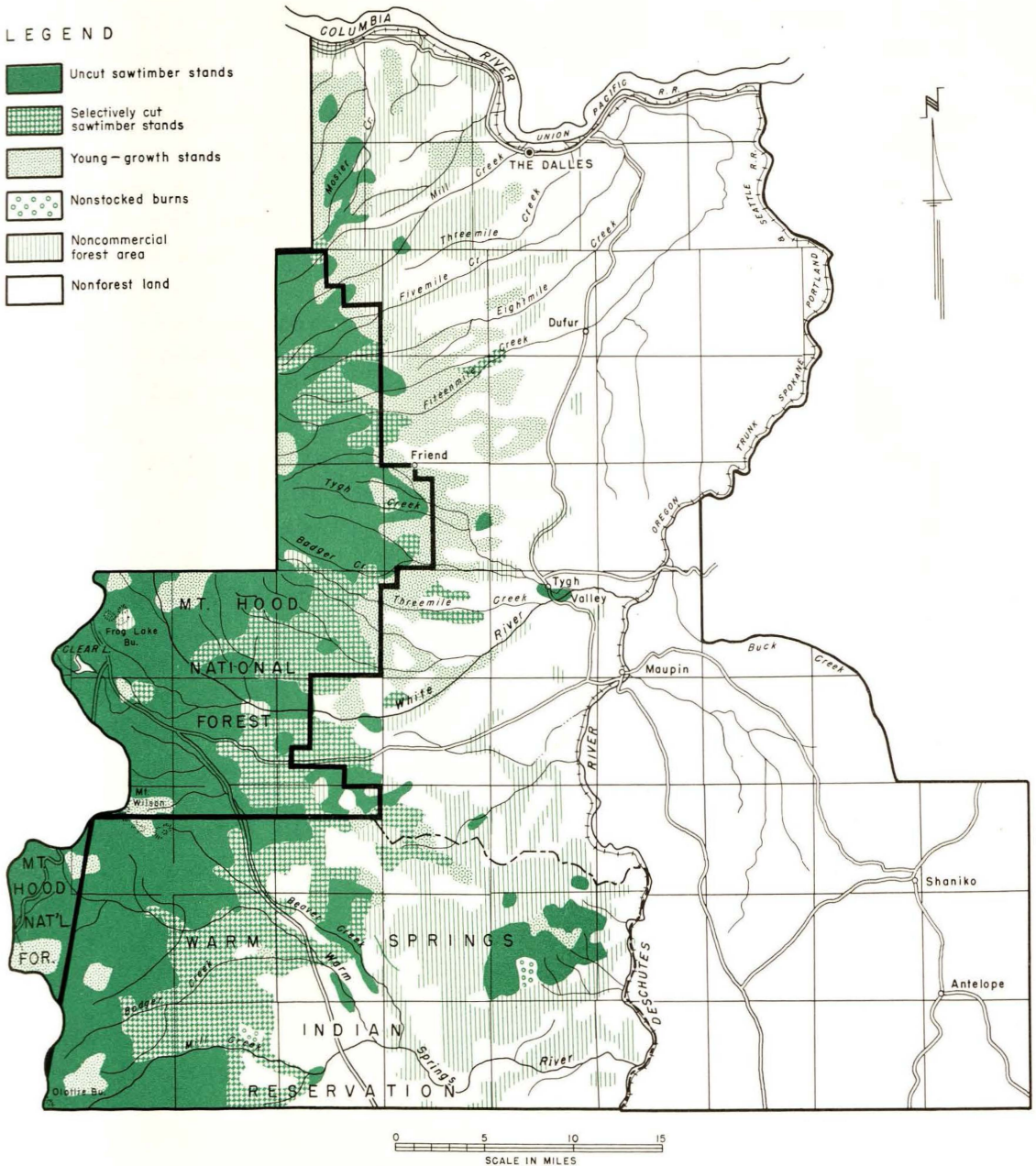
FOREST STAND-SIZE AND CONDITION CLASSES

WASCO COUNTY, OREGON

1954

LEGEND

-  Uncut sawtimber stands
-  Selectively cut sawtimber stands
-  Young-growth stands
-  Nonstocked burns
-  Noncommercial forest area
-  Nonforest land



DESCRIPTION OF THE COUNTY

Wasco County is located in north-central Oregon. It extends 60 miles south from the Columbia River, across the east slope of the Cascade Range and the "high desert." The eastern boundary is formed principally by the Deschutes and John Day Rivers; the western boundary, by the Cascade summit and Hood River County. Wasco County has an area of approximately 1,528,000 acres. It was the first county established in eastern Oregon and originally included the whole of the State's area east of the Cascade Divide.

The topography of the western part of the county is mountainous and is featured by numerous sharp peaks, narrow ridges, and deep valleys. The most rugged topography is that of the central western part, which borders Mount Hood. The southeastern two-thirds of the county is an arid plateau, broken by rolling hills and occasional peaks and by numerous deep canyons. Elevations within the county average about 1,800 feet, ranging from 95 feet along the Columbia River to about 5,700 feet at Flag Point, which is almost on the county boundary and just east of Mount Hood.

The Deschutes River and its most important tributaries, White River and Warms Springs River, are the principal streams within the county. A small area in the southeastern part is drained by the John Day River, and the northern part--comprising about 25 percent of the county area--is drained by streams flowing directly into the Columbia River. The Deschutes River has cut a canyon across the county approximately 1,200 feet deep.

Products can be transported by road, rail, or water within the county. U. S. Highway 30, following the Columbia River, is the major east-west artery; two federal highways, U. S. 97 and U. S. 197, provide transportation north and south along the east side of the county; the Wapinitia Highway, connecting with Highway 197 at Maupin, provides a short route across the mountains to Portland; and the recently improved Warm Springs Highway is a major route to Portland and Bend. The main line of the Union Pacific Railroad parallels the Columbia River, and a trunk line follows the Deschutes River. The Columbia River is navigable by river craft, and water transportation of bulky commodities such as wheat and logs is common practice.

The population in 1955, according to the Oregon State Board of Health, numbered 24,540 inhabitants. A steady increase in population has been noted by the Bureau of the Census, with estimates of 12,646 in 1930, 13,069 in 1940, and 15,552 in 1950. The population is classified as about 50 percent urban and 50 percent rural and non-farm. The Dalles, located on the Columbia River, is the county seat and only incorporated city. In 1950 it had a population of 7,933--about 50 percent of the county total. Other principal towns include Dufur, Maupin, Mosier, Antelope, and Friend.

There is a wide difference in climatic conditions within the county. The eastern two-thirds is arid and subject to extreme temperatures. Humid conditions and cool summer temperatures prevail in the western part. Annual precipitation since 1850 has averaged about 12 inches in the eastern part of the county and 40 inches in the western part. At The Dalles, it has averaged 17 inches, ranging from 9 to 29 inches.

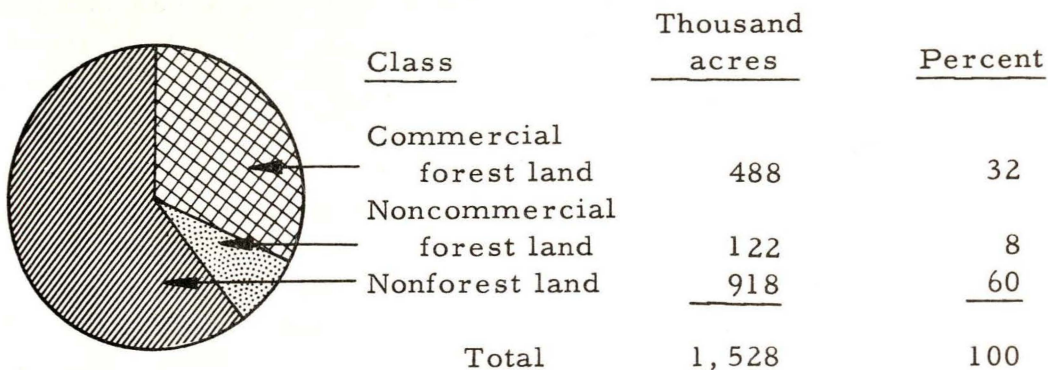
SIGNIFICANT FINDINGS IN THE FOREST INVENTORY

Land Classification

Approximately three-fifths of the land in Wasco County is nonforested. A very large part of the 918,000 acres classified as nonforest land is in ranches and is used seasonally for grazing of sheep and cattle. The U. S. Census of Agriculture found a total of 118,000 acres of cropland harvested in 1954, most of which was irrigated and cropped for wheat and hay. The forest land is also grazed in season.

Almost four-fifths of the forested area is commercial forest land. It occurs as a relatively narrow band of timber across the western part of the county, chiefly within the Mount Hood National Forest and the Warm Springs Indian Reservation.

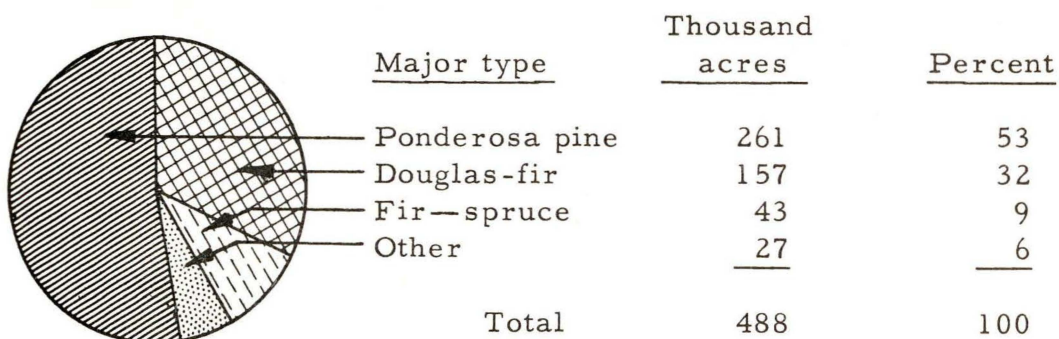
The greatest part of the noncommercial forest land is in the semi-arid eastern part of the county and is occupied by oak and juniper.



Commercial Forest Land Area

Major Types

Although 9 forest types were recognized in the survey, 3 of them occupied most of the area. These are ponderosa pine, Douglas-fir, and fir—spruce, which cover 94 percent of the commercial forest area. Other types, with smaller areas, include hemlock and lodge-pole pine.



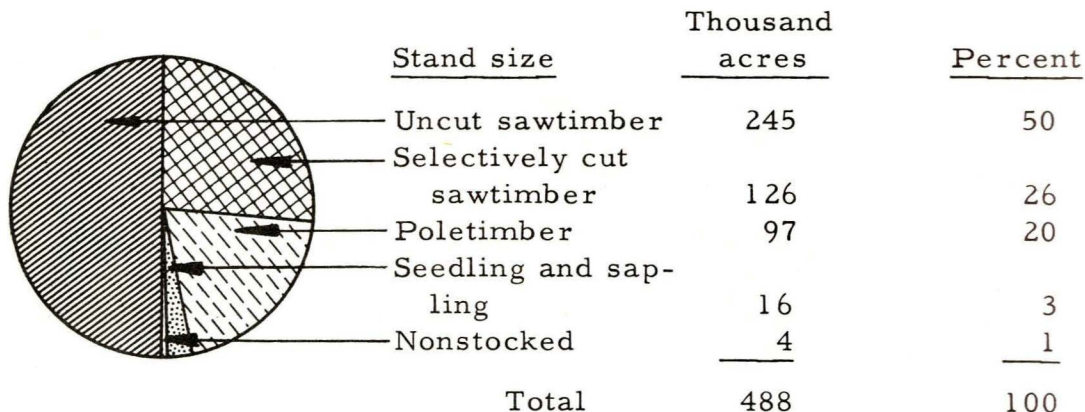
Distribution of types closely follows climatic conditions within the commercial forest area. The semi-arid eastern part is occupied by the typical ponderosa pine forests, whereas in higher, more humid parts the forest types are more characteristic of western Oregon, in which Douglas-fir, hemlock, and true firs predominate.

Stand-Size Class

Timber harvesting operations, nearly all on a selective-cutting basis, have materially influenced the stands on 184,000 acres,

or 38 percent of the total commercial forest area of 488,000 acres. On 126,000 acres of this logged area, the residual stands are of sufficient volume--1,500 board-feet or more per acre--to be classed as selectively cut sawtimber. On 58,000 acres the residual stands are of young trees less than sawtimber size.

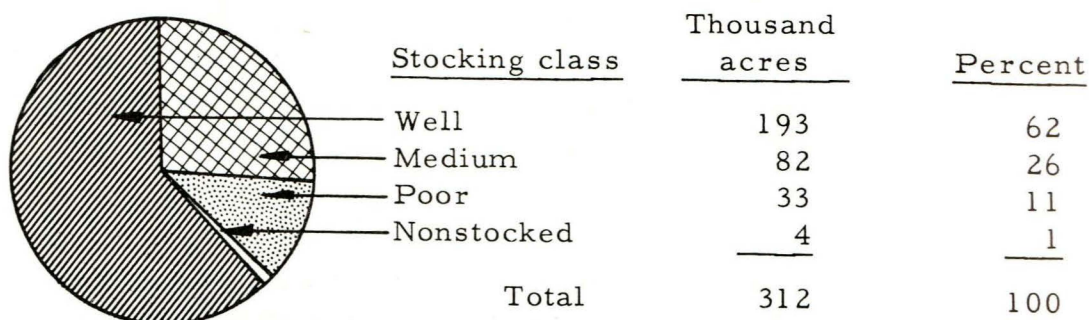
Most of the effect of timber harvesting has been concentrated in the ponderosa pine type. In this type, 31 percent of the area is either poletimber or seedling and sapling stands. Other types have only 15 percent of their total area in the younger age stands.



Of the 245,000 acres of uncut sawtimber, the stands on 182,000 acres were classed as "large sawtimber," i. e., most of the volume is in trees more than 21 inches d. b. h.; stands on 63,000 acres were classed as "small sawtimber," i. e., trees from 11 to 20.9 inches d. b. h.

Stocking of Young-Growth Stands

Most of the young-growth stands are adequately stocked. Eighty-eight percent of these stands, which include young-growth sawtimber, poletimber, and seedling and sapling classes, are medium to well stocked. The remaining 12 percent is poorly stocked or nonstocked.



About 30 percent of the ponderosa pine sawtimber stands are well stocked, 63 percent medium stocked, and 7 percent poorly stocked. Eighty-nine percent of the Douglas-fir sawtimber stands are well stocked and 11 percent are medium stocked.

In the poletimber stands, 27 percent is well stocked, 46 percent medium stocked, and 27 percent poorly stocked. Seedling and sapling stands have 27 percent of their area well stocked, 45 percent medium stocked, and 28 percent poorly stocked.

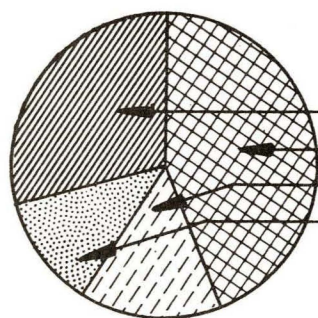
In classifying young-growth stands for stocking, all commercial tree species of all sizes are considered in determining the degree or class of stocking. Thus, a young-growth sawtimber stand may be classed as well stocked on the basis of sawtimber-size trees, poletimber, seedlings and saplings, or any combination of these tree sizes.

Commercial Forest Land Timber Volumes

Net volume of live sawtimber on commercial forest land is estimated to total 7,493 million board-feet, log scale, Scribner rule, or 8,104 million board-feet, log scale, International 1/4-inch rule. Of the total Scribner volume, 93 percent (6,994 million board-feet) is in sawtimber stands; the remaining 499 million board-feet is in scattered sawtimber trees in the overstory of young stands and in widely scattered sawtimber trees in nonstocked areas. Volume of growing stock (live trees 5 inches d.b.h. and larger, including trees of both poletimber and sawtimber size) is estimated to be 1,647 million cubic feet. Of this volume, 93 percent (1,524 million cubic feet) is in sawtimber stands and 7 percent in other stands.

Volume of Sawtimber by Species

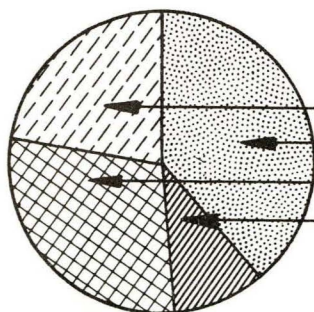
Douglas-fir, the county's most abundant species, makes up 44 percent of the total sawtimber volume. Douglas-fir and species other than ponderosa pine comprise 71 percent of the county's total sawtimber volume, although occurring on only 47 percent of the forest area. This is mainly due to (1) greater density of tree growth under the more moist conditions at higher elevations and (2) less cutting in these stands than in the ponderosa pine type. Ponderosa pine, which only represents 29 percent of the sawtimber volume, is the county's most valuable commercial species.



<u>Species</u>	<u>Sawtimber Million bd.-ft.</u>	<u>Percent</u>
Ponderosa pine	2,152	29
Douglas-fir	3,328	44
True firs	1,087	15
Other species	<u>926</u>	<u>12</u>
Total	7,493	100

Volume of Sawtimber by Diameter Classes

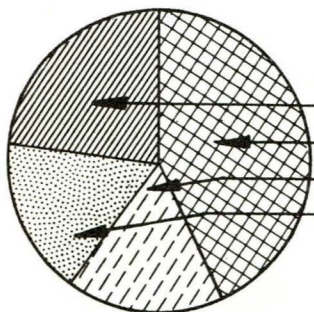
The majority of the sawtimber volume occurs in the 21.0—30.9-inch diameter class. Ponderosa pine occurs as slightly larger trees than the county average, with a percentage distribution among four 10-inch diameter classes of 17, 37, 34, and 12, in order of increasing size.



<u>Diameter class</u>	<u>Million bd.-ft.</u>	<u>Percent</u>
11.0-20.9	1,681	23
21.0-30.9	2,877	38
31.0-40.9	2,092	28
41.0 +	<u>843</u>	<u>11</u>
Total	7,493	100

Volume of Growing Stock by Species

Growing-stock volume includes both poletimber-size trees (5.0-10.9 inches d.b.h.) and sawtimber-size trees (11 inches d.b.h. and larger). Of the total growing stock, 90 percent is in sawtimber trees, 10 percent in poletimber trees.

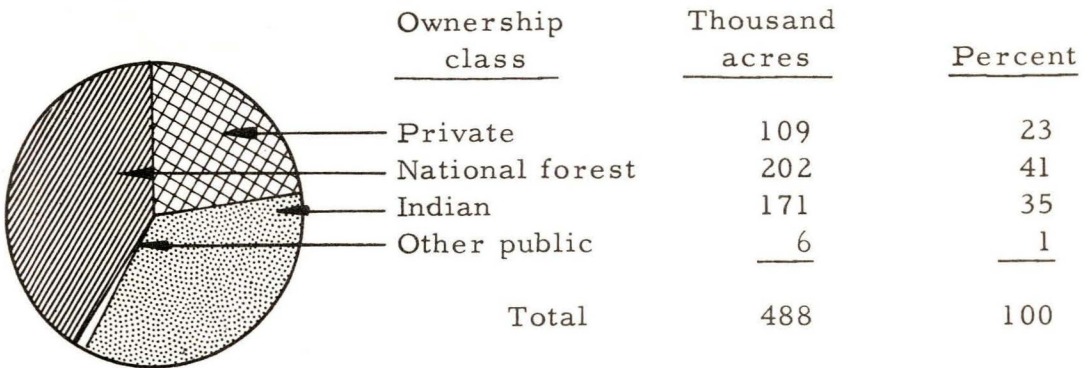


<u>Species</u>	<u>Growing stock Million cu. ft.</u>	<u>Percent</u>
Ponderosa pine	384	23
Douglas-fir	711	43
True firs	299	18
Other species	<u>253</u>	<u>16</u>
Total	1,647	100

Forest Ownership

Commercial Forest Land

Three major ownership classes occur in Wasco County: national forest, Indian, and private. These three classes account for 99 percent of the commercial forest land. The remaining 1 percent is divided among State, municipal, and federal Bureau of Land Management ownerships.

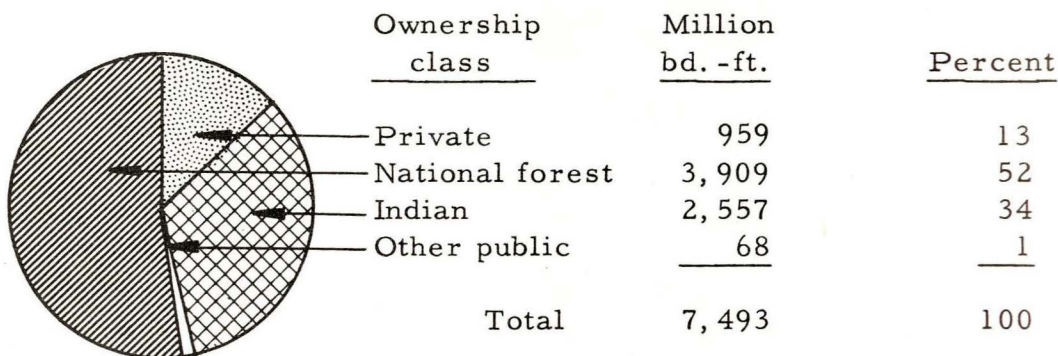


Most of the federally owned or managed forest land is contained in the Mount Hood National Forest and the Warm Springs Indian Reservation. The private land is concentrated chiefly in the northern part of the county, with some of it extending southward along the eastern limits of the national forest.

Seventeen percent of the privately owned commercial forest area is stocked with uncut sawtimber stands and 18 percent is in residual sawtimber stands. Sixty-six percent of the national forest is in uncut sawtimber stands and 22 percent is in residual sawtimber stands. On the Indian lands, 53 percent is in uncut sawtimber stands and 35 percent in residual sawtimber stands.

Sawtimber Volume

Slightly over half of the live sawtimber volume is in the Mount Hood National Forest, and a third is Indian owned. These two ownerships account for 86 percent of all live sawtimber volume in the county. Practically all of the remaining volume is in private ownership.



Forest Utilization

During the 5-year period 1949-53, the volume of sawtimber cut annually from the county's commercial forest land averaged 101 million board-feet, log scale, Scribner rule. Approximately 95 percent of this volume was removed from the forests in the form of timber products (consisting almost entirely of logs) and 5 percent remained as logging residue.

Annual log production has varied since 1952 from a low of 100 million board-feet to a high of 121 million board-feet in 1955. A general upward trend in production is occurring, with most of the increase coming from an expanded harvest of private and national-forest timber. The cut of Indian timber in the county in recent years has been fairly stable.

Table 1. -- Land area, by major class of land, 1954

Class of land	:	Area
		<u>Acres</u>
Forest:		
Commercial		487, 830
Noncommercial:		
Productive-reserved		100
Unproductive		122, 160
Total		610, 090
Nonforest		917, 590
All classes		1, 527, 680

Table 2. -- Area of commercial forest land, by ownershipand stand-size classes, 1954

(In acres)

Ownership class	Total	Sawtimber stands	Poletimber stands	Seedling and sapling stands	Nonstocked areas
Private	108,870	38,900	58,240	11,170	560
State	1,280	560	680	40	-
Municipal	2,220	1,280	610	330	-
Federally owned or managed:					
Indian	170,900	151,270	16,500	800	2,330
Bur. of Land Mgt.	2,650	1,650	880	120	-
National forest	201,910	177,610	20,160	3,660	480
Total Federal	375,460	330,530	37,540	4,580	2,810
All ownerships	487,830	371,270	97,070	16,120	3,370

Table 3.--Area of commercial forest land, by major forest type and stand-size class, 1954

(In acres)

Forest type	Total	Sawtimber stands		Pole-timber stands	Seedling & sapling stands	Non-stocked areas
		Large ^{1/}	Small ^{2/}			
Ponderosa pine	261,120	147,150	33,350	67,800	12,820	--
Western white pine	80	--	80	--	--	--
Lodgepole pine	7,480	--	1,640	5,420	420	--
Douglas-fir	156,550	101,730	37,360	16,580	880	--
Larch	520	--	240	280	--	--
Fir—spruce	43,010	17,470	16,910	6,710	1,920	--
Hemlock—Sitka spruce	14,800	11,190	3,250	280	80	--
Hardwoods	900	--	900	--	--	--
Nonstocked areas	3,370	--	--	--	--	3,370
Total	487,830	277,540	93,730	97,070	16,120	3,370

^{1/} 21 inches d.b.h. and larger.^{2/} 11-20.9 inches d.b.h.

Table 4. --Land area, by cover type,

		(In
Cover type or land class	Total	:
	unreserved	:
	and	:
	reserved	:
		PRODUCTIVE
		Total
1 Ponderosa pine, large sawtimber	147,150	
2 Ponderosa pine, small sawtimber	33,350	
3 Ponderosa pine, poletimber	67,900	
4 Ponderosa pine, seedlings and saplings	12,820	
5 Western white pine, small sawtimber	80	
6 Lodgepole pine, small sawtimber	1,640	
7 Lodgepole pine, poletimber	5,420	
8 Lodgepole pine, seedlings and saplings	420	
9 Douglas-fir, small old-growth and large young-growth sawtimber (red fir)	101,730	
10 Douglas-fir, small sawtimber	37,360	
11 Douglas-fir, poletimber	16,580	
12 Douglas-fir, seedlings and saplings	880	
13 Western larch, small sawtimber	240	
14 Western larch, poletimber	280	
15 White fir, large sawtimber	840	
16 White fir, small sawtimber	3,490	
17 White fir, poletimber	320	
18 True firs, large sawtimber	16,630	
19 True firs, small sawtimber	13,420	
20 True firs, poletimber	6,390	
21 True firs, seedlings and saplings	1,920	
22 Western hemlock, large sawtimber	11,190	
23 Western hemlock, small sawtimber	3,250	
24 Western hemlock, poletimber	280	
25 Western hemlock, seedlings and saplings	80	
26 Hardwoods, small sawtimber	900	
27 Nonstocked area, recently clear cut	640	
28 Nonstocked area, old clear cut	120	
29 Nonstocked area, deforested by fire	2,610	
Total	487,930	
		NONCOMMERCIAL
30 Noncommercial, rocky	9,930	
31 Oak—madrone	46,390	
32 Juniper	65,840	
Total	122,160	
		NONFOREST
33 Grass and brush, and open--nonvegetative	917,590	
Total	917,590	
		ALL
Forest land:		
34 Commercial	487,830	
35 Noncommercial (productive-reserved and unproductive)	122,260	
36 Total forest land	610,090	
37 Nonforest land	917,590	
38 Total, all land	1,527,680	

^{1/} Unclassified as to ownership or type.

ownership class, and land-use class, 1954

acres)

Unreserved										Reserved	
					Federally owned or managed						
Total	Private	State	County	Municipal	Indian	Bureau of Land Mgt.	National forest	Total	State		
FOREST LAND											
Commercial								Noncommercial (productive-reserved)			
147,150	9,070	120	--	170	86,980	320	50,490	--	--	1	
33,350	11,020	240	--	80	15,500	160	6,350	--	--	2	
67,800	47,080	680	--	330	11,240	640	7,830	100	100	3	
12,820	11,130	40	--	330	40	120	1,160	--	--	4	
80	--	--	--	--	--	--	80	--	--	5	
1,640	--	--	--	--	760	--	880	--	--	6	
5,420	--	--	--	--	2,890	--	2,530	--	--	7	
420	--	--	--	--	340	--	80	--	--	8	
101,730	8,440	40	--	180	19,490	680	72,900	--	--	9	
37,360	8,910	160	--	850	11,900	490	15,050	--	--	10	
16,580	11,120	--	--	280	840	240	4,100	--	--	11	
880	40	--	--	--	120	--	720	--	--	12	
240	--	--	--	--	160	--	80	--	--	13	
280	40	--	--	--	--	--	240	--	--	14	
840	40	--	--	--	--	--	800	--	--	15	
3,490	40	--	--	--	840	--	2,610	--	--	16	
320	--	--	--	--	40	--	280	--	--	17	
16,630	440	--	--	--	7,170	--	9,020	--	--	18	
13,420	120	--	--	--	8,430	--	4,870	--	--	19	
6,390	--	--	--	--	1,490	--	4,900	--	--	20	
1,920	--	--	--	--	300	--	1,620	--	--	21	
11,190	--	--	--	--	--	--	11,190	--	--	22	
3,250	--	--	--	--	--	--	3,250	--	--	23	
280	--	--	--	--	--	--	280	--	--	24	
80	--	--	--	--	--	--	80	--	--	25	
900	820	--	--	--	40	--	40	--	--	26	
640	160	--	--	--	--	--	480	--	--	27	
120	120	--	--	--	--	--	--	--	--	28	
2,610	280	--	--	--	2,330	--	--	--	--	29	
487,830	108,870	1,280	--	2,220	170,900	2,650	201,910	100	100		
UNPRODUCTIVE FOREST LAND											
9,850	5,160	40	--	--	1,650	1,120	1,880	80	80	30	
46,390	38,230	--	40	950	2,810	1,880	2,480	--	--	31	
65,840	15,130	--	--	--	48,830	1,840	40	--	--	32	
122,080	58,520	40	40	950	53,290	4,840	4,400	80	80		
LAND											
917,510								80	80	33	
917,510								80	80		
LAND											
487,830	108,870	1,280	--	2,220	170,900	2,650	201,910	--	--	34	
122,080	58,520	40	40	950	53,290	4,840	4,400	180	180	35	
609,910	167,390	1,320	40	3,170	224,190	7,490	206,310	180	180	36	
917,510								80	80	37	
527,420								260	260	38	

Table 5.--Area of commercial forest land, by forest-condition and ownership classes, 1954

(In acres)

Forest-condition class	:	:	:	:	:	Federally owned or managed		
	:	:	:	:	:	:	:	:
	Total	Private	State	Municipal	:	Indian	Bureau of Land Management ^{1/}	National forest
	:	:	:	:	:	:	:	:
Softwoods:								
Large sawtimber:								
Uncut	181,870	9,630	40	350	65,080	480	106,290	
Residual	95,670	8,360	120	--	48,560	520	38,110	
Total	277,540	17,990	160	350	113,640	1,000	144,400	
Small sawtimber:								
Uncut	62,470	8,720	160	530	25,910	490	26,660	
Residual	30,360	11,370	240	400	11,680	160	6,510	
Total	92,830	20,090	400	930	37,590	650	33,170	
Poletimber:								
On cutover land	47,480	35,920	680	--	4,950	400	5,530	
On other	49,590	22,320	--	610	11,550	480	14,630	
Total	97,070	58,240	680	610	16,500	880	20,160	
Seedlings & saplings:								
On cutover land	10,180	9,140	40	160	--	120	720	
On other	5,940	2,030	--	170	800	--	2,940	
Total	16,120	11,170	40	330	800	120	3,660	
Hardwoods	900	820	--	--	40	--	40	
Nonstocked	3,370	560	--	--	2,330	--	480	
Total	487,830	108,870	1,280	2,220	170,900	2,650	201,910	

^{1/} All public domain land.

Table 6. -- Area of young-growth timber stands on commercial forest land,
by stocking class, species group, and stand-size class, 1954

(In acres)

Stocking class and species group	Total	Sawtimber		Poletimber	Seedlings and saplings	Nonstocked area
		Large young growth ^{1/}	Small young growth			
Well stocked:						
Softwoods	193,170	98,370	64,920	25,620	4,260	--
Hardwoods	160	--	160	--	--	--
Total	193,330	98,370	65,080	25,620	4,260	--
Medium stocked:						
Softwoods	81,210	3,360	25,490	45,060	7,300	--
Hardwoods	620	--	620	--	--	--
Total	81,830	3,360	26,110	45,060	7,300	--
Poorly stocked:						
Softwoods	33,370	--	2,420	26,390	4,560	--
Hardwoods	120	--	120	--	--	--
Total	33,490	--	2,540	26,390	4,560	--
Nonstocked	3,370	--	--	--	--	3,370
All groups:						
Softwoods	307,750	101,730	92,830	97,070	16,120	--
Hardwoods	900	--	900	--	--	--
Nonstocked	3,370	--	--	--	--	3,370
Total	312,020	101,730	93,730	97,070	16,120	3,370

^{1/} Includes only the stands classified and mapped as Douglas-fir, large young-growth sawtimber type.

Table 7. -- Net volume of live sawtimber and growing stock on commercial forest land, by ownership class, 1954

Ownership class	:	:	:
	:	Live sawtimber	: Growing stock
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Table 8. -- Net volume of live sawtimber and growing stock on commercial forest land, by stand-size class, 1954

Stand-size class	:	Live sawtimber	:	Growing stock
	:		:	
	:		:	
	:		:	
	Million bd.-ft., log scale <u>Scribner rule</u>	Million bd.-ft., International <u>1/4-inch rule</u>		Million <u>cubic feet</u>
Sawtimber stands	6,994	7,570		1,524
Poletimber stands	491	526		121
Seedling and sapling stands	7	7		1
Nonstocked areas	1	1		1
Total	7,493	8,104		1,647

Table 9.--Net volume of live sawtimber and growing stock on commercial forest land, by species, 1954

Species	:	:	Growing stock
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	:	Live sawtimber	
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1/ Less than 0.5 million.

Table 10. -- Net volume of live sawtimber on commercial forest land,
by diameter class and species group, 1954

(In million board-feet)

Diameter class (Inches d.b.h.) and log rule	Total	Ponderosa pine	Douglas- fir	Other softwoods	Hardwoods
11.0-20.9:					
Scribner rule	1,681	368	536	777	(1/)
International 1/4-inch rule	1,894	427	621	846	(1/)
21.0-30.9:					
Scribner rule	2,877	791	1,166	920	--
International 1/4-inch rule	3,106	854	1,259	993	--
31.0-40.9:					
Scribner rule	2,092	739	1,164	189	--
International 1/4-inch rule	2,222	783	1,234	205	--
41.0 and larger:					
Scribner rule	843	254	462	127	--
International 1/4-inch rule	882	264	481	137	--
All diameter classes:					
Scribner rule	7,493	2,152	3,328	2,013	(1/)
International 1/4-inch rule	8,104	2,328	3,595	2,181	(1/)

^{1/} Less than 0.5 million.

Table 11. -- Net volume of all timber on commercial forest land,
by class of material and species group, 1954

(In million cubic feet)

Class of material	Total	Softwoods	Hardwoods
Growing stock:			
Sawtimber trees:			
Sawlog portion	1,374	1,374	--
Upper stem portion	103	103	--
Total	1,477	1,477	--
Poletimber trees	170	169	1
Total growing stock	1,647	1,646	1
Other material:			
Sound cull trees	1	1	(1/)
Rotten cull trees	19	19	(1/)
Salvable dead trees	36	36	--
Total other material	56	56	--
All timber	1,703	1,702	1

1/ Less than 0.5 million.

Table 12. -- Average annual cut of live sawtimber and growing stock
on commercial forest land, by species group, 1949-53

Species group	Live sawtimber						Growing stock		
	Scribner rule, log scale			International 1/4-inch rule					
	Timber products	Logging residue	Annual cut ^{1/}	Timber products	Logging residue	Annual cut ^{1/}	Timber products	Logging residue	Annual cut ^{1/}
	----- <u>Thousand board-feet</u> -----			----- <u>Thousand cubic feet</u> -----					
Softwoods	96,059	5,312	101,371	103,974	5,750	109,724	20,942	2,517	23,459
Hardwoods ^{2/}	--	--	--	--	--	--	--	--	--
Total	96,059	5,312	101,371	103,974	5,750	109,724	20,942	2,517	23,459

^{1/} Annual cut is the sum of timber products and logging residue.

^{2/} Hardwood cut insignificant.

FOREST SURVEY PROCEDURE

Procedures used in the Forest Survey reinventory of Wasco County were materially different from those used in the initial inventory. This change in procedures accounts for some significant differences in both the forest-area and timber-volume statistics obtained. Therefore, a brief description of each of the procedures seems desirable.

Initial Inventory

The initial inventory of the county was conducted in 1933 and 1934 by what is known as the "compilation method." In this method, existing information on forest types, timber cruises, logging records, and other pertinent data were collected from private timber owners and various public agencies. These data were checked in the field for reliability and were adjusted to the specifications and standards of Forest Survey. Forest-type and timber-volume data for areas not covered by reliable existing information were obtained through field reconnaissance.

All land in the county was classified as either forest or non-forest. Forest land was further classified as commercial or noncommercial; the commercial was still further classified by forest type, stand-size or condition class, and in case of young growth, by stocking class. All such types and classes were mapped in place on 1-inch-to-the-mile base maps of each forested township. These township type maps were then superimposed over current ownership-status plats and dot counted to obtain forest-type area statistics by ownership class. Type delineations on the township maps were traced on a base map of the county to form a county forest type map. The commercial forest land was also classified as to site quality, or forest productive capacity.

In-place, timber-volume estimates were based on existing cruises collected and adjusted to the Forest Survey standard, on field samples, and on ocular appraisals. Cruises made by commercial cruisers were obtained for most of the privately owned timber. Separate volume estimates were computed for each of the commercial tree species and for each ownership class. Methods used in this initial inventory did not permit a statistical computation of accuracy of the estimate.

Reinventory

In the reinventory in 1954 the forest type map of the county was completely revised. This revision was accomplished through interpretation, classification, and field mapping on aerial photos, which covered all of the county. In the delineation of types and conditions on aerial photos, similar types were examined on the ground to ensure accuracy in interpretation. The presence of old and new roads through much of the forested area greatly facilitated these examinations. Types, stand-size classes, and stocking classes were similar to those recognized in the initial inventory. However, field mapping on aerial photos resulted in much greater accuracy and detail than was possible in the earlier inventory through ground reconnaissance alone. Type delineations on the aerial photos were transferred to a 2-inch scale county planimetric base map through use of a photo projector. The new type map was then superimposed over a current ownership-status map and a dot count made of forest type areas by ownership class.

Estimates of net volumes of live sawtimber, growing stock, rotten and sound cull, and salvable-dead material were developed by applying average per-acre volumes to the appropriate forest type acreages. The per-acre volumes for stands of sawtimber and poletimber were obtained through a sampling procedure in which the stands were measured on randomly selected plots. Comparable sawtimber and poletimber per-acre volumes contained in scattered trees in the overstory of seedling and sapling stands and nonstocked areas were based on empirical estimates. In the random selection of samples, each individual sawtimber or poletimber plot in the county had an equal chance to be chosen. A sample consisted of a series of 3 fifth-acre circular plots spaced at 6-chain intervals. Intensity of the sampling was designed to produce a total estimate of volume within a specified sampling accuracy.

ACCURACY OF 1954 REINVENTORY DATA

Forest Area

In the reinventory of the county, in-place mapping of the forests and their classification by forest type, stand-size class, or condition class, were done on the basis of 100-percent coverage. Thus no error due to sampling was involved. Errors due to techniques or judgment in the field and in office computation of data were possible, but difficult to evaluate. Throughout all phases of the work, close supervision and frequent checks assured a high level of accuracy and uniformity of standards.

Timber Volume

The chances are 19 out of 20 that the board-foot volume of live sawtimber, if measured by a 100-percent cruise, would be within plus or minus 16.9 percent of the reinventory's estimated total of 7,493 million board-feet, log scale, Scribner rule. At the same level of accuracy, cubic-foot volume of growing stock from a 100-percent cruise would be within a range of plus or minus 14.8 percent of the estimated 1,647 million cubic feet. Volume estimates by species, stand-size class, or other subdivision have greater sampling errors.

DIFFERENCES IN RESULTS OF INVENTORIES

Some of the differences between area and volume statistics from the initial inventory and those from the reinventory are due to actual physical change. Other differences are due to variations in procedures used, in interpretation and classification of forest conditions, and in standards of utilization. Because of these differences, direct comparison of the statistics is not meaningful except insofar as these differences are taken into account.

Forest Area

Forest-area statistics resulting from the inventories, in thousands of acres, are as follows:

	<u>Inventory</u>	
	<u>1934</u>	<u>1954</u>
Total forest land	511	610
Noncommercial unproductive forest land	40	122
All other forest areas: ^{1/}		
Sawtimber:		
Uncut	364	245
Residual	10	126
Total	374	371
Poletimber, seedlings and saplings	89	113
Nonstocked	8	4

^{1/} Includes commercial forest land and noncommercial but productive forest land.

Differences in forest area and in stand-size and condition classes reflect in part both real changes, such as those brought about by logging and growth, as well as differences brought about by changes in survey procedures and specifications. In general, during the 20 years between inventories it appears that (1) the total area of forest land has increased because a larger area of sparsely stocked western juniper has been classed as noncommercial, unproductive forest land; (2) logging, which has materially reduced the area of uncut sawtimber stands, has resulted in an increased area of residual sawtimber stands; (3) the increase in poletimber and seedling and sapling stands is due in part to ingrowth and restocking of cutover and nonstocked areas; (4) reproduction has become established on much of the area nonstocked in 1934 and clear cut between 1934 and 1954.

Timber Volume

The estimates of sawtimber volume (million board-feet, log scale, Scribner rule) obtained in the two inventories are shown in the following tabulation:

	<u>Inventory</u>	
	1934	1954
Ponderosa pine	2,408	2,152
Douglas-fir	1,303	3,328
Other species	<u>880</u>	<u>2,013</u>
Total	4,591	7,493

It is probable that several factors influenced the two respective estimates of timber volumes in the county. One factor that increased the board-foot volume of sawtimber during the 20 years between inventories was forest growth--net growth in sawtimber trees and the ingrowth of poletimber trees into the sawtimber class. An offsetting factor, one that reduced the sawtimber inventory since 1934, was drain due to timber cutting and to the various natural depleting agencies, such as forest insects, diseases, windthrow, and fire.

Another factor of substantial influence was the variation between inventories in the procedures used and in the specifications upon which the two estimates were based, as outlined previously under Survey Procedures.

The influence of difference in procedures cannot be closely evaluated. The 1954 volume estimate has a calculated sampling error (see page 24 under Accuracy of 1954 Reinventory Data, Timber Volume). However, no statistical evaluation of the accuracy of the 1934 estimate can be made.

Another cause of the difference in volumes may have been the variation in standards of utilization between inventories. The standards for Douglas-fir, white fir, and western larch were changed between surveys to recognize the increased degree of industrial use of these species. In 1954, volume tables were used that gave a materially greater volume for a tree of a given size than did the tables used in the 1934 inventory. Other changes included lowering the minimum merchantable top diameter of a sawtimber tree, and reducing the minimum requirement of net sound volume in a sawtimber tree from 33-1/3 to 25 percent of gross volume.

Because of the influence of these and possibly other factors, the two estimates are not on a comparable basis and do not necessarily reflect a trend in the county's total volume of sawtimber.

DEFINITION OF TERMS USED

Land Area

Total Land Area

Includes dry land and unmeandered water surface.

Forest Land Area

Includes (a) land that is at least 10-percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; and (b) land from which the trees described in (a) have been removed to less than 10-percent stocking and that has not been developed for other use. Minimum area of forest land recognized in reinventory of the county is 10 acres.

Nonforest Land Area

Land that does not qualify as forest land. Minimum area recognized in the reinventory of the county is 10 acres.

Forest Land Classes

Commercial Forest Land Area

Forest land that is producing, or is physically capable of producing, usable crops of wood, economically available now or prospectively, and that is not withdrawn from timber utilization.

Noncommercial Forest Land Area

Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order but that otherwise qualifies as commercial forest land, and (b) incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Types

Forest Land Types

Forest land is typed on the basis of predominant species as indicated by cubic volume for sawtimber and poletimber stands, and number of trees for seedling and sapling stands, or on the basis of forest condition such as nonstocked cutover or burned-over land. Where none of the indicated species comprises 50 percent or more of a given stand, the stand is typed on the basis of plurality of cubic volume or number of trees. In classifying forest land by type, the minimum area recognized is 40 acres.

Commercial Forest Land

Major forest types. Local forest types are grouped into generalized types. The major forest types in Wasco County are as follows:

Ponderosa pine. Forests in which 50 percent or more of the stand is ponderosa pine.

Western white pine. Forests in which 50 percent or more of the stand is western white pine.

Lodgepole pine. Forests in which 50 percent or more of the stand is lodgepole pine.

Douglas-fir. Forests in which 50 percent or more of the stand is Douglas-fir.

Larch. Forests in which 50 percent or more of the stand is larch.

Fir-spruce. Forests in which 50 percent or more of the stand is true fir or Engelmann spruce.

Hemlock-Sitka spruce. Forests in which 50 percent or more of the stand is hemlock or Sitka spruce.

Hardwoods. Forests in which 50 percent or more of the stand is black cottonwood, Oregon oak, or red alder, singly or in combination.

Noncommercial Forest Land

Productive-reserved. Forest land withdrawn from timber utilization through statute, ordinance, or administrative order, but that otherwise qualifies as commercial forest land.

Unproductive. Forest land incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Nonforest Land Types

Agricultural. Cultivated land or stump pasture.

Grass and brush. Grass or brush on nonforest land.

Open-nonvegetative. Includes barrens, tideflats, towns, and unmeandered water.

Tree Classes

Sawtimber Tree

Tree of commercial species, 11 inches d.b.h. or larger, that contains at least one 16-foot coniferous sawlog or one 8-foot hardwood sawlog to a variable top diameter never less than 8 inches inside the bark. Also, 25 percent or more of the gross board-foot volume must be free from rot or defect.

Poletimber Tree

Softwood or hardwood tree 5.0-10.9 inches d.b.h. of commercial species in which 25 percent or more of the gross cubic-foot volume is free from rot and defect.

Seedling and Sapling Trees

Live trees of commercial species less than 5 inches d.b.h. Seedlings must be of good form and vigor.

Cull Tree

Live tree of sawtimber or poletimber size that is unmerchantable, now or prospectively, because of defect, rot, or species.

Sound cull tree. Live tree of sawtimber or poletimber size that contains 25 percent or more of sound volume but will not make at least one merchantable log, now or prospectively, because of roughness or poor form.

Rotten cull tree. Live tree of sawtimber or poletimber size in which less than 25 percent of the total volume is sound.

Salvable Dead Tree

Standing dead or down tree that contains 25 percent or more of sound volume and at least one merchantable 16-foot coniferous or 8-foot hardwood log.

Stand-Size Classes

Sawtimber Stand

Stand of sawtimber trees having a minimum net per-acre volume of 1,500 board-feet, log scale, International 1/4-inch rule (approximately 1,375 board-feet, log scale, Scribner rule).

Large sawtimber stand. Stand in which the majority of the volume is in trees 21 inches d.b.h. or larger.

Small sawtimber stand. Stand in which the majority of the volume is in trees 11.0-20.9 inches d.b.h.

Uncut Sawtimber Stand

Sawtimber stand that is essentially undisturbed by cutting.

Residual Sawtimber Stand

Sawtimber stand in which over 10 percent of the volume has been removed and in which the residual volume amounts to 1,500 board-feet or more per acre.

Poletimber Stand

Stand failing to meet sawtimber-stand specifications but at least 10-percent stocked with poletimber and larger (5 inches d.b.h. and larger) trees and with at least half the minimum stocking in poletimber trees.

Seedling and Sapling Stand

Stand not qualifying as either a sawtimber or a poletimber stand but having at least 10-percent stocking of trees of commercial species and with at least half the minimum stocking in seedling and sapling trees.

Stocking

Stocking is the extent to which growing space is effectively utilized by present or potential growing-stock trees of commercial species. "Degree of stocking" is synonymous with "percent of growing space occupied" and means the ratio of actual stocking to full

stocking for comparable sites and stands. Stocking may be measured in terms of number of trees, volume, basal area, cover canopy, or other criterion or combination of criteria.

Well-stocked stands. Stands that are 70 percent or more stocked with present or potential growing-stock trees.

Medium-stocked stands. Stands that are 40 to 69 percent stocked with present or potential growing-stock trees.

Poorly stocked stands. Stands that are 10 to 39 percent stocked with present or potential growing-stock trees.

Nonstocked areas. Areas that are 0 to 9 percent stocked with present or potential growing-stock trees.

Timber Volume

Live Sawtimber Volume

Net volume in board-feet of live sawtimber trees of commercial species.

Scribner rule. The common board-foot rule used in determining log-scale volume of sawtimber in the Pacific Northwest.

International 1/4-inch rule. The standard board-foot rule adopted nationally by the Forest Service in the presentation of Forest Survey volume statistics.

Growing Stock

Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4-inch top (of central stem) inside bark.

All-Timber Volume

Net volume in cubic feet of live and salvable dead sawtimber trees and poletimber trees of commercial species, and cull trees of all species from stump to a minimum 4-inch top inside bark.

Tree Species

Tree species commonly found in Wasco County include:

- Softwoods:^{2/} Ponderosa pine (Pinus ponderosa)
Western white pine (Pinus monticola)
Lodgepole pine (Pinus contorta)
Douglas-fir (Pseudotsuga menziesii)
Western hemlock (Tsuga heterophylla)
Mountain hemlock (Tsuga mertensiana)
Western larch (Larix occidentalis)
Pacific silver fir (Abies amabilis)
Noble fir (Abies procera)
Grand fir (Abies grandis)
White fir (Abies concolor)
Subalpine fir (Abies lasiocarpa)
Engelmann spruce (Picea engelmannii)
Western redcedar (Thuja plicata)
Incense-cedar (Libocedrus decurrens)
- Hardwoods: Black cottonwood (Populus trichocarpa)
Oregon white oak (Quercus garryana)
Red alder (Alnus rubra)

Timber Cut

Annual Cut of Live Sawtimber

The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from live sawtimber. The volume of timber products cut from live sawtimber.

Logging residues from live sawtimber. The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land and not converted to timber products.

^{2/} Sugar pine (Pinus lambertiana) also occurs in the county, but in limited quantities.

Annual Cut of Growing Stock

The net cubic-foot volume of live sawtimber and poletimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from growing stock. The volume of timber products cut from growing stock.

Logging residues from growing stock. The net cubic-foot volume of growing stock cut or killed by logging on commercial forest land and not converted to timber products.

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127